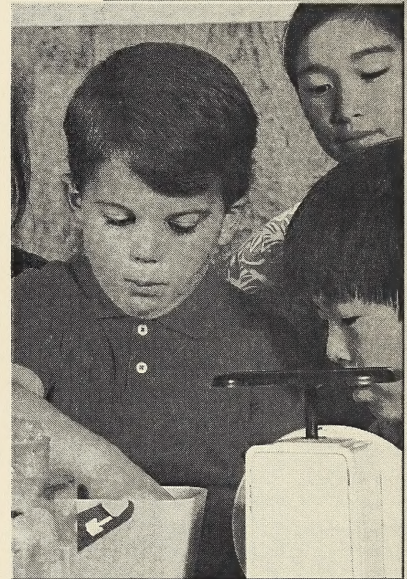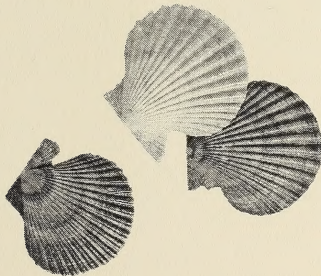Mathematics

Module 2

Working with Big Numbers

Home Instructor's Guide: Days 1–9
and
Assignment Booklet 2A

Learning Technologies Branch

Alberta LEARNING

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

You may find the following Internet sites useful:

- Alberta Learning, **http://www.learning.gov.ab.ca**
- Learning Technologies Branch, **http://www.learning.gov.ab.ca/ltb**
- Learning Resources Distributing Centre, **http://www.lrc.learning.gov.ab.ca**

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Module 2: Working with Big Numbers

Introduction

In Module 2, the student continues working with number concepts. Estimating and working with place value and base tens is the focus of this module.

Estimation

Students need to know when and how to estimate. An estimate is a guess or a rough calculation. The context of a problem helps to determine when it is necessary or desirable to have an exact answer or an estimate of that answer. Estimation is especially important as it helps determine the reasonableness of computed answers.

Place Value

As mentioned in Module 1, simply knowing numbers is not enough. The student must develop number sense. To do this, the student must understand numbers. Understanding place value is critical to this understanding.

The position of a digit in a number represents its value. For example, the value of **6** in 680 is different from its value in 62 or 16.

Base Ten

To develop number sense, the student needs to understand base ten. The word *base* means a collection. The ten digits, 0 through 9, are the base for the number system.

Before You Begin

Before the student begins working on Module 2, you need to prepare some of the materials that will be used in this module.

Number Spinner

Remove the Number Spinner from the Appendix. Cut the spinner out. You can use a paper clip as the arm. Put the paper clip in the middle of the spinner. Put the pencil tip inside the paper clip on the centre of the spinner and hold it there. The student then spins the paper clip.
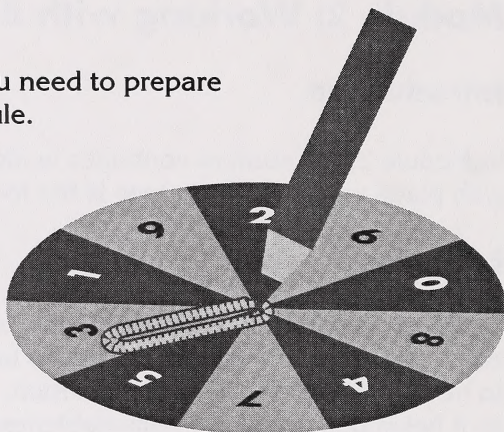
Bean Sticks

It is important that the student see the representation of tens in a variety of ways, so that place value will not be associated with one particular model. For this reason, having base ten blocks, interlocking cubes, and home-made tens is essential. Wooden craft sticks or tongue depressors wrapped in groups of ten and bound by elastics is one base ten model. Another is bean sticks.

Help the student make ten bean sticks. Explain that there are always ten beans on a stick. Once there are ten beans on a stick, it becomes a bean stick.

Help the student glue the beans on either wooden craft sticks or tongue depressors. Ensure the beans are evenly spaced on the stick. Set these to dry well before using them on Day 5.

It is important that the student experiences making most of the sticks so that he or she knows there are indeed ten beans on a stick. Making bean sticks not only reinforces the base ten concept, it also instills a feeling of ownership.

Daily Summary

Day 1

Day 1: Lessons 1 and 2

These lessons reacquaint the student with estimating.

Arrange 12 items in a box or 12 books on a shelf. After looking at the shells, show the 12 items you arranged. Ask the student about how many items there are. Tell the student not to count each one, but to guess about how many are there. Allow a few seconds for the student to do this without counting. By using the word *about*, the student can begin to understand the concept of estimation. If the student answers any number close to 12, say that 12 is the exact answer, but the estimate was good. Always identify good estimates. The student should be told that the exact number is not always better than a good estimate.

Day 1: Lesson 3

Discuss with the student how Jasper came up with 15 for his answer. Let the student come up with other strategies. Tell the student that Jasper could see two groups of five shells, so he knew right away there were at least ten. He saw that there were extra shells, but wasn't sure how many. He knew there were at least three. He added the extra ones to 10 and said 15.

There are extension activities for Day 1.

Have the student do the assignment for Day 1 after completing the day's lessons.

Day 2

The student will be estimating by grouping items into tens.

Day 2: Lesson 3

The student is familiar with tens and ones from Grade One. The student should be able to see the correlation between the tens and the ones and the final number. For example, 8 tens and 4 ones are 84.

There are extension activities for Day 2.

Have the student do the assignment for Day 2 after completing the day's lessons.

Day 3

Day 3: Lesson 1

The student will be grouping manipulatives into groups of ten.

Day 3: Lesson 2

The student will be estimating numbers to 100 and representing the numbers in various ways using the base ten blocks and unit cubes.

The student will be estimating the number of items in a jar. There are a series of steps that you need to take for this lesson. Follow the margin notes in the Student Module Booklet carefully.

You will need a jar that can be filled with about 70 items and a container small enough to hold about 10 items.

Ensure the student understands each step before you proceed to the next one.

Have the student do the assignment for Day 3 after completing the day's lessons.

Day 4

Day 4: Lesson 1

The student will be estimating numbers. In this lesson, the jars are the same size, but the manipulatives are not.

Fill two jars that are the same size with manipulatives. Tape or place a piece of paper labelling the jars Jar A and Jar B. One set of manipulatives should be small, such as dried peas; the other should be larger, like unit cubes. Put the smaller items into Jar A. Ensure that Jar A does not have more than 100 items in it.

There are extension activities for Day 4.

Have the student do the assignment for Day 4 after completing the day's lessons.

Day 5

Day 5: Lesson 1

The student will be using tens in the form of bean sticks to estimate larger numbers.

Day 5: Lesson 2

After the student answers the questions, play the Spinning Game using the bean sticks. The student spins the paper clip. It will land on a number. The student will place that number of bean sticks on the desk, for example, seven bean sticks. Then the student spins again. This time, the student will place the number of single beans spun beside the bean sticks, for example, two beans. The student will then write down the number, which in this case is 72.

The student may play this game until math time is over.

Day 6

Day 6: Lesson 1

In this lesson, the student decides, without counting, how many items there are.

Take a Place-Value Mat out of the Appendix. Place three bean sticks on the tens column and four beans on the ones column.

Cover the mat with a scarf or other material after you have put the counters on the mat. Do not let the student see what you have done.

Lift the cover off the mat and let the student look at the counters for a couple of seconds only. This is very important.

In the first set of questions, ask how the student knew the answer. The student should answer that since there were 3 bean sticks, there had to be at least 30 beans. And since there were extra beans, there had to be more than 30. If the student does not understand, review counting by tens, the amount of beans on each bean stick, and how 3 bean sticks represent 30.

For the second set of questions, the student should answer that since there were only 3 bean sticks, there had to be 30. And since there were only a few extra beans, and that was not enough to make another 10, there couldn't be 40. Again, review these concepts if the student does not understand this.

Day 6: Lesson 2

In this lesson, the student learns that you can count either the ones or tens first. The end result is always the same.

The student should count the beans in the ones column first. The student will count 1, 2, 3, 4, 14, 24, 34. Practise this until the student is comfortable with it. Tell the student to count whichever way is most comfortable. The student should know, though, that you can count both ways and that either way is correct.

Day 6: Lesson 3

Writing the numbers on the Place-Value Mat helps the student associate the symbol with the model, which helps to explain the concept of place value in a concrete way.

There are extension activities for Day 6. These activities could be used for Days 6 to 10. For Activity 1, dictate a number between 1 and 100 to the student. The student will build the number using a place-value model and then draw the number in three different ways. Give the student a few sheets of paper to draw the numbers.

Have the student do the assignment for Day 6 after completing the day's lessons.

Day 7

Day 7: Lesson 1

Different place-value models are discussed today. The student will be using base ten blocks, interlocking cubes, and rods to show tens and ones. The student is familiar with these from Grade One. Review these with the student.

Day 7: Lesson 2

Help the student bundle the wooden craft sticks. Note that questions 5 and 6 do not use the place-value models from Lesson 2. They use sets of objects. Tell the student that these items are grouped in tens and are to be counted the same way the place-value models are counted. Have the student count one group in each set to show that there are indeed ten items in each circle.

Answers

1. a. 7 tens 8 ones
   b. 78

2. a. 6 tens 3 ones
   b. 63

3. a. 8 tens 4 ones
   b. 84

4. a. 9 tens 7 ones
   b. 97

5. a. 5 tens 3 ones
   b. 53

6. a. 9 tens 2 ones
   b. 92

Day 8

Day 8: Lesson 1

The student will be representing numbers in different ways. For example, 4 bean sticks and 12 single beans are 52, and 52 can also be represented using 3 bean sticks and 22 single beans.

Day 8: Lesson 2

Guide the student in showing 47 in different ways. First, place the 4 tens in the tens column and the 7 cubes in the ones column. Have the student print this number again in the place-value chart. Then suggest using 3 tens. Have the student take a ten out of the tens column, break it up into individual cubes, and put them in the ones column. Ask the student why the cubes must be broken up. The student will respond that only ones can go into the ones column. Ask the student what the number is now. Have the student print the way the number is represented now on the place-value chart. The student will print the number each time a ten is removed from the tens column.

Now suggest 2 tens. Have the student take another ten out of the tens, break it up, and put it into the ones column. Ask what the number is after each removal of a ten. The student will come to realize that the number remains the same each time. Continue with this with one ten, then none. Guide the student to comprehend that as each ten is removed from the tens column, it is moved to the ones column. The student knows how to count by ten and will see that 7 cubes become 17, then 27, then 37, and then 47. Tens are added at each count with the removal of ten from the tens column.

The student's chart will look like this:

Tens	Ones	Number
4	7	47
3	17	47
2	27	47
1	37	47
0	47	47

Ensure the student understands this concept thoroughly before proceeding.

Day 8: Lesson 3

In this lesson, the student gets more practice with the concept of using more and fewer blocks to draw the same number. For example, 63 can be represented by 5 rods and 13 cubes. Using more blocks, the representation can be 4 rods and 23 cubes, or 3 rods and 33 cubes. Using fewer blocks, the representation can be 6 rods and 3 cubes. Ensure the student practises this until the concept is understood.

Answers

1. a. 55
   b. 4 tens 15 ones
   c.

Tens	Ones	Number
4	15	55

   d. 19

2. a. 55
   b. 3 tens 25 ones
   c.

Tens	Ones	Number
3	25	55

d. 28
e. yes
f. yes

3. a. 55
    b. 5 tens 5 ones
    c.

Tens	Ones	Number
5	5	55

    d. 10
    e. yes
    f. Yes, it is the same number. There are always 55 ones altogether.

The student works on the assignment for Day 9 after completing the day's lessons.

Day 9

The student will be drawing the blocks on place-value charts while building them to help reinforce the concept of representing numbers in different ways. Guide the student through the lesson.

Have the student work on the assignment for Day 9 after completing the day's lessons.

When the student finishes the assignment, direct him or her to the Student Survey and Student Checklist in the Assignment Booklet 2A. The student may work on these alone or with your help. Go over the responses and discuss them with the student. Give additional instruction as needed for any of the concepts the student has indicated he or she needs help with.

Ensure that you complete the Home Instructor's Evaluation Checklist and Feedback forms for Days 1 to 9. In the Home Instructor's Feedback, give any information you think may be helpful for the teacher to know.

Submit Assignment Booklet 2A for marking.

Home Instructor's Comments and Questions

_____

Home Instructor's Signature

FOR SCHOOL USE ONLY

Assigned Teacher:

_____

Grading

Mathematics:

_____

Neatness:

_____

Date Assignment Booklet
Received:

_____

FOR HOME INSTRUCTOR USE
(if label is missing or incorrect)

Student File Number:

_____

Grading Scale

A – Very Satisfactory
B – Satisfactory
C – Needs Attention
D – Unsatisfactory

Apply Module Label Here

Name

Address

Postal Code

Please verify that preprinted label is for correct course and module.

Teacher's Comments

_____

Teacher's Signature

Home Instructor: Keep this sheet when it is returned to you as a record of the student's progress.

INSTRUCTIONS FOR SENDING IN THIS
DISTANCE LEARNING ASSIGNMENT BOOKLET

When you register for distance learning courses, you are expected to send in Assignment Booklets for corrections regularly. Try to send each Assignment Booklet as soon as you have completed it. Before sending your Assignment Booklet, please check the following:

- Are all the assignments completed? If not, explain why.
- Has your work been reread to be sure the spelling and details are correct?
- Is the record form filled out and the correct module label attached?

MAILING

1. Postage Regulations

Do **not** enclose letters with Assignment Booklets.

Send all letters in a separate envelope.

2. Postage Rates

Take your Assignment Booklet to the post office and have it weighed. Attach enough postage and seal the envelope. Assignment Booklets will travel faster if correct postage is used and if they are in large envelopes that are no more than two centimetres thick.

FAXING

1. Assignment Booklets may be faxed. Contact your teacher for the fax number.

2. All faxing costs are the responsibility of the sender.

E-MAILING

Assignment Booklets may be e-mailed. Contact your teacher for the e-mail address.

Module 2

Working with Big Numbers

Assignment Booklet 2A

**Learning
Technologies
Branch**

Alberta
LEARNING

Grade Two Mathematics
Module 2: Working with Big Numbers
Assignment Booklet 2A
Learning Technologies Branch

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64		66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1. What number should be in the shaded box of the one hundred chart?

2. What number comes after it?

3. What number comes before it?

4. Count forward five from the shaded box. What number do you get?

5. Count backward five from the shaded box. What number do you get?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

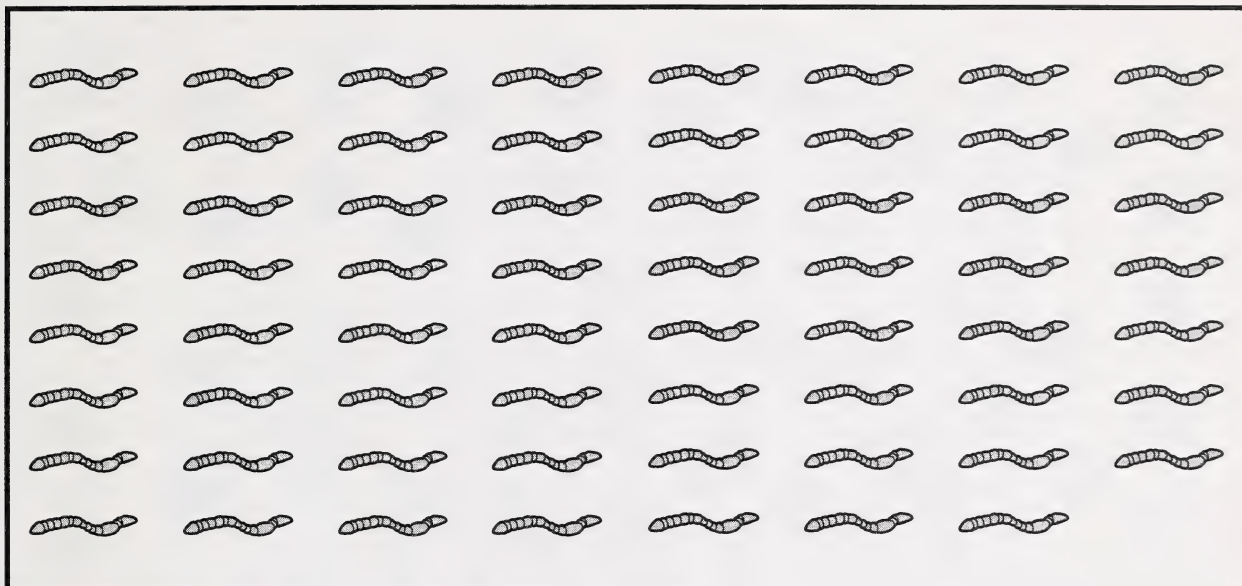1. What number should be in the shaded box?

2. What number comes after it?

3. What number comes before it?

4. Count forward ten from the shaded box. What number do you get?

5. Count backward ten from the shaded box. What number do you get?

1. Look at this picture of worms to answer the questions.

a. I estimate ☐ worms.

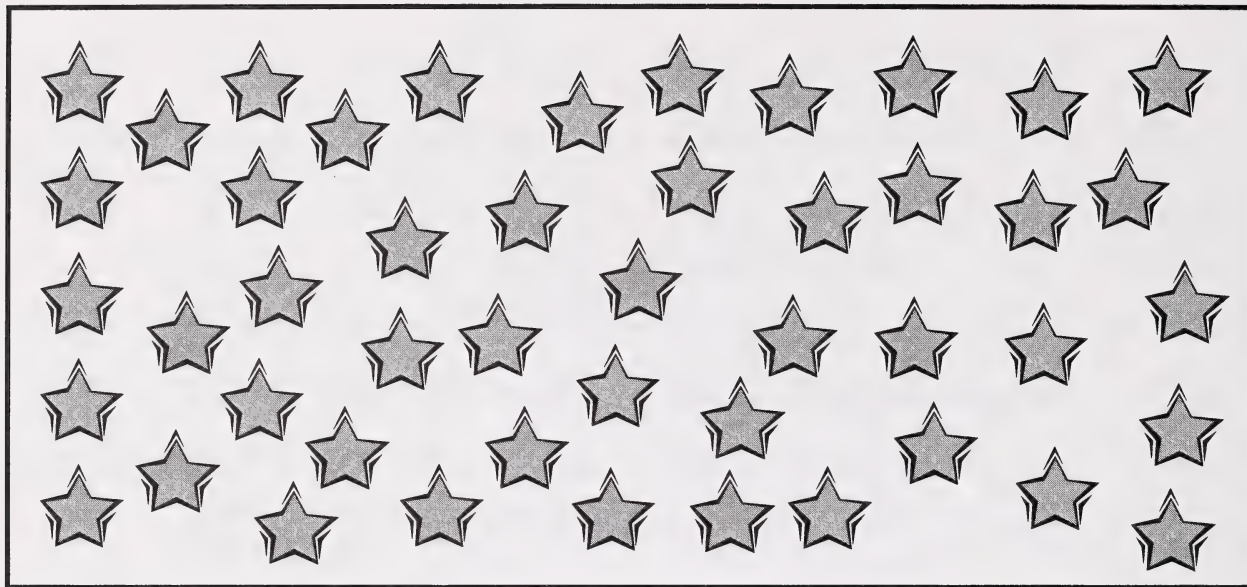b. Now circle the worms in groups of ten.

c. ☐ tens ☐ ones

d. The actual number of worms is ☐ .

e. Is this greater or fewer than your estimate?

_____

2. Look at this picture of stars to answer the questions.

a. I estimate ☐ stars.

b. Now circle the stars in groups of ten.

c. ☐ tens ☐ ones

d. The actual number of stars is ☐.

e. Is this greater or fewer than your estimate?
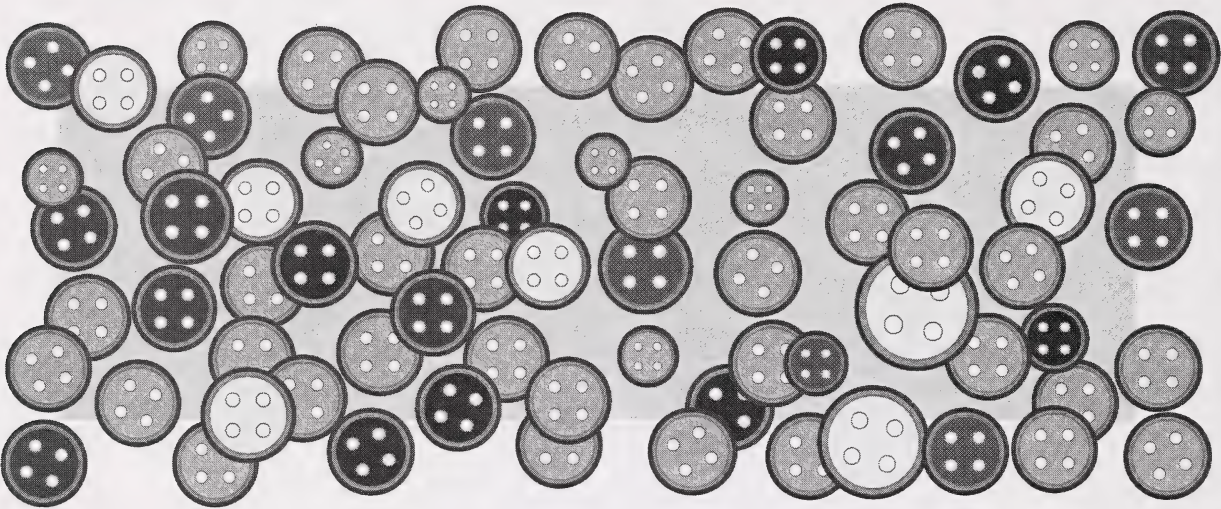
_____

3. Draw one of the numbers in three different ways.

1. Estimate the number of buttons.

I estimate [   ] buttons.

2. Circle the buttons in groups of ten.

[   ] tens [   ] ones

3. The actual number is [   ].

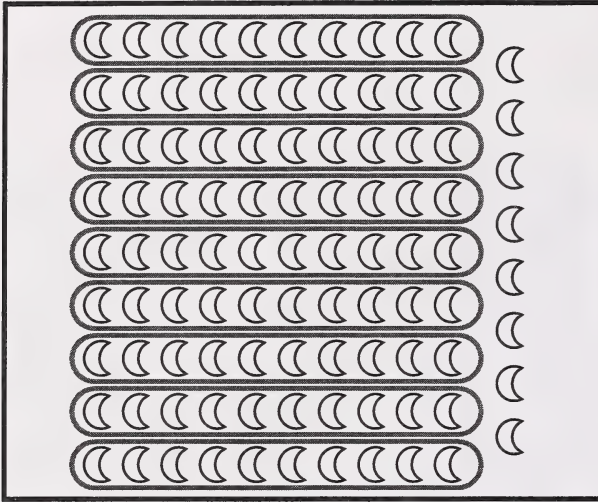4. Is your estimate greater or fewer than the actual number?

_____

5. Draw rods and cubes to show the number.
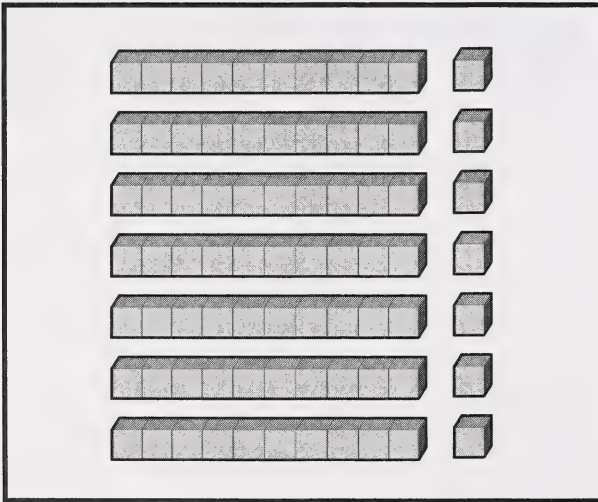
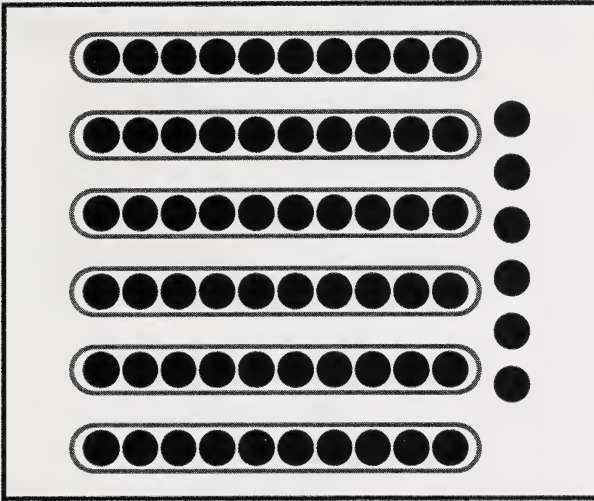Count and print the numbers for each.

1.

a. ☐ tens ☐ ones

b. _____
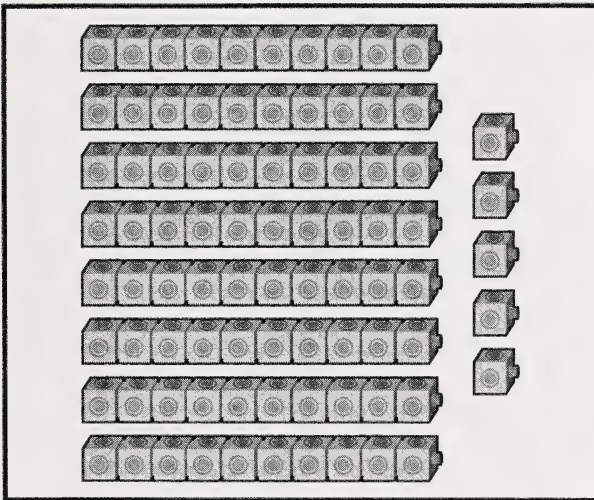
2.

a. ☐ tens ☐ ones

b. _____

3.

a. ☐ tens ☐ ones

b. _____

4.

a. ☐ tens ☐ ones

b. _____

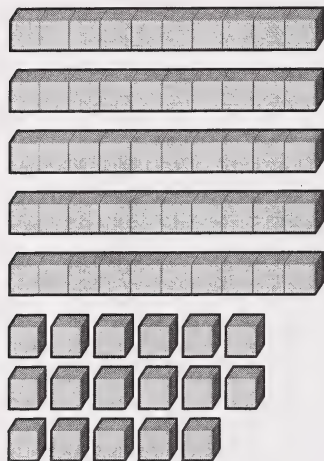1. Count the blocks and print the number shown.

a. actual number ☐

b. ☐ tens ☐ ones

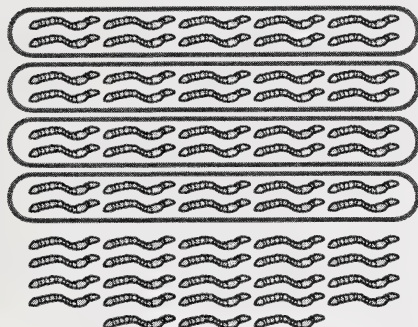c. Draw the same number using more blocks.

☐ tens ☐ ones

d. Draw the same number using fewer blocks.

☐ tens ☐ ones

2. Count the worms and print the number shown.

a. actual number ☐

b. ☐ tens ☐ ones

c. Draw the same number using more worms.

☐ tens ☐ ones

d. Draw the same number using fewer worms.

☐ tens ☐ ones

Fill in the charts to show different ways of making the numbers.

1.

Tens	Ones	Number
6		62
	12	62
4		62
	32	62

4.

Tens	Ones	Number
	26	96
8		96
	6	96
5		96

2.

Tens	Ones	Number
	29	89
8		89
	89	89
7		89

5.

Tens	Ones	Number
2		47
	17	47
4		47
	37	47

3.

Tens	Ones	Number
6		71
	1	71
5		71
	41	71

6.

Tens	Ones	Number
	40	50
4		50
	0	50
3		50

Student Survey

Days 1 to 9

Think about what you have learned in Days 1 to 9. Then answer these questions.

What did you find easy about Days 1 to 9?

_____

_____

_____

_____

_____

List **three** things you learned in Days 1 to 9.

_____

_____

_____

_____

_____

Is there something you would like to know more about?

_____

_____

_____

_____

_____

Is there something you still need help with?

_____

_____

_____

_____

_____

Student Checklist

Days 1 to 9

I know how to . . .	Put a check mark beside the things you can do.
1. estimate and then count the number of objects in a set (0 to 100) and compare the estimate with the actual number	
2. recognize, build, compare, and order sets that contain 0 to 100 elements	

Home Instructor's Evaluation Checklist

Days 1 to 9

| Specific Outcomes/ Concepts Learned

The student . . .	Has the student mastered the concept (yes or no)?
1. estimates and then counts the number of objects in a set (0 to 100) and compares the estimate with the actual number	
2. recognizes, builds, compares, and orders sets that contain 0 to 100 elements	

Home Instructor's Feedback